Fracking and Seismic Risks

Jeremy Brown January 15, 2013

With explorers and producers looking to expand their operations in the Monterey Shale, in quake-prone California, even more attention is likely to be put on the uncertain seismic impacts of hydraulic fracturing and the proper way to regulate against harmful ground movements.

In recent years, as fracking has become more common, seismologists have recorded a significant uptick in midcontinent quakes. In Arkansas and Texas, in Ohio and Oklahoma – in places that are, in short, far from continental plates – the ground has shifted, at times strongly enough to be felt.

Among scientists, a consensus seems to emerging that underground wastewater injections – rather than drilling or fracturing – is to blame, though some contrarians suspect that even fracturing could have seismic consequences.

As several prominent studies have pointed out, the seismic impacts of disposal wells are not unique to fracking. In discussing the USGS report, David Hayes, deputy secretary of the Department of the Interior, recalled that wastewater injections in the early 1960s, at the Rocky Mountain Arsenal, near Denver, had caused quakes.

But assessing the precise impacts of fracking and related activities is difficult. Most injections do not trigger tremblers. Those that do may be some distance from quake epicenters and may be in areas that have experienced numerous injections. Untangling the causality becomes tough.

Cliff Frohlich, an associate director and senior research scientist at the Institute of Geophysics at the University of Texas, has compared fracking to smoking: "You can't say that smoking caused one particular person to get cancer. But if you look at the statistics, it's pretty clear that smoking causes cancer."

Law generally moves slower than technology, and most state energy regulators can barely keep up with fracking, much less make sense of the seismic implications. Texas has been experiencing induced tremors since at least 2008, for instance, but the state Railroad Commission has only recently begun to develop comprehensive fracking-specific regulations.

Since the shale boom is expected to continue for decades, federal and state regulators will have to address seismic risks at some point. Until then, by not acting, regulators are effectively deeming the risks too minimal to justify further permitting requirements or oversight.

Making key policy decisions on the basis of unsettled science is always tricky, but ensuring that operators follow best practices – such as injecting at pressures below a certain level and conducting greater seismic diligence – could at least reduce risks.

In a hearing of the Texas House Committee on Energy Resources last summer, Melinda Taylor, executive director of the Center for Global Energy, International Arbitration, and Environmental Law, pointed to the example of Ohio, which requires operators to do a "fairly detailed analysis of the geological conditions" before being issued permits for new disposal wells.

In the interim, courts could develop patchwork case law, but that seems unlikely. While a considerable amount of litigation has focused on fracking, virtually none has involved earthquakes.

The exception is a class action brought in an Arkansas federal court last year that accused three companies of operating their disposal wells in ways that "caused thousands of earthquakes in mini-clusters and swarms in central Arkansas in 2010 and 2011." The plaintiffs claimed the earthquakes resulted in property damage, emotional distress and economic losses due to business stoppage. But the plaintiffs withdrew before the court could make any determinations.

It is possible that other plaintiffs in fracking suits have considered but decided against pursuing seismic claims. For the same reasons that scientists have had trouble isolating the impacts of specific fracking operations, plaintiffs would be hard pressed to prove a causal link between a particular injection and a particular quake.

And even then prospective plaintiffs might be unable to prove that an operator has an obligation not to cause quakes. In states that do not have regulations on point, for instance, courts might look to EPA injection regulations to determine the proper standard of care; but those focus on protecting against groundwater contamination rather than against earthquakes.

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